

Vloga vključenega in opolnomočenega pacienta v fizioterapiji

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Uvod: Vključitev pacienta v proces zdravstvene obravnave kot enakopravnega člana zdravstvenega tima je temeljni pogoj kakovostne obravnave. Pacient prevzame odgovornost za svoje zdravje (1), pri čemer je treba upoštevati njegove vrednote, prioritete in splošne poglede ter vzajemno izmenjevati podatke (2). Aktivna vključitev pacienta v zdravstveno obravnavo v sodelovanju s fizioterapevti je mogoča v vlogi vključenega ali opolnomočenega pacienta, pri čemer se obe vlogi malenkostno razlikujeta. Medsebojni odnos med partnerjema ni enakovreden (3), zato so bistvenega pomena zaupnost (4), pacientova zavzetost in postavitev realističnih ciljev (5). Namen: Z raziskavo smo želeli preučiti, koliko fizioterapevti poznajo pomen vključenosti in opolnomočenja pacienta. **Metode:** Raziskava je potekala junija 2014, in sicer med fizioterapevti v javnem zdravstvu. Kot instrument raziskave smo uporabili spletni anketni vprašalnik. V vzorec smo zajeli prvih 25 pravilno izpolnjenih anketnih vprašalnikov. Za obdelavo podatkov smo uporabili računalniška programa SPSS Statistics 20 in Microsoft Office Excel. **Rezultati:** Odgovornost za zdravje so anketiranci v večini (60 %) primerov pripisali pacientom. Kot najpomembnejšo fizioterapevtovo nalogo so izbrali določitev cilja zdravstvene obravnave (92 %) v sodelovanju s pacientom in sledenje navodilom fizioterapevta (64 %). Večina (84 %) fizioterapevtov meni, da se njihova vloga v procesu zdravstvene obravnave s povečanjem vloge pacienta ne bo zmanjšala. Toda nekateri pacienti (20 %) imajo po mnenju fizioterapevtov raje pasivno kot aktivno vlogo v zdravstveni obravnavi. Anketiranci so za dvig kakovosti pri obravnavi pacienta zaznavali potrebo po dodatnem znanju (76 %), predvsem po znanju psihologije in psiholoških pristopov (58 %) ter komunikacijskem znanju (31 %). **Zaključki:** Za dvig kakovosti v fizioterapiji je nujna aktivna vključitev pacienta v tim kot tudi v proces fizioterapevtske obravnave. Termin »opolnomočenje« je še precej neznan in tudi v teoriji težje razložljiv ter pogosto enačen s terminom »vključen pacient«. Potrebno je zavedanje, da s prenosom odgovornosti oziroma z delitvijo odgovornosti pridobijo vsi udeleženci v procesu zdravstvene obravnave.

Ključne besede: pacient, vključenost, opolnomočenje, zdravstvena obravnava, fizioterapija.

The role of involved and empowered patient in physiotherapy

Introduction: The patient's involvement in the process of medical treatment as an equal member of the medical team is of great importance, since by doing so the patient takes over the responsibility for his or her own health (1). It is important to consider his or her values, priorities and general points of view as well as mutual exchange of information (2). An active involvement of a patient in the health treatment in cooperation with physiotherapists is only possible for a patient by playing a role of an involved or empowered patient, where both roles differ slightly. The relationship between both partners is not equal (3), therefore the basic elements and values of the partnership are confidence (4), engagement of the patient and setting realistic goals (5). **Purpose:** With the present research, we wished to study to which extent physiotherapists know the meaning of the patient's involvement and empowerment. **Methods:** The research was done in June 2014 among physiotherapists working in public healthcare. As an instrument of the research, we used an internet questionnaire. We included the first 25 correctly filled in questionnaires into the sample. We used SPSS Statistics 20 and Microsoft Office Excel computer programs for data processing. **Results:** According to the respondents, the responsibility for health was in most cases (60%) attributed to patients. As the most important task of the physiotherapist they chose the goal setting of the medical treatment (92%) in cooperation with the patient and following the instructions of the physiotherapists (64%). According to physiotherapists' opinion (84%), their role with the patient's involvement into the process of medical treatment is not reduced. However, the respondents' opinion is, that some patients (20%) prefer passive to active role in medical treatment. The respondents perceived the need of additional knowledge in the treatment of the patient (76%), above all psychology as well as psychological approaches (58%) and of communication skills (31%). **Conclusion:** In order to raise the quality of the physiotherapeutic treatment of a patient it is necessary to include the patient into the team and into the process of his/her health treatment actively. The term »empowerment« is still relatively unknown, also in the theory it is difficult to be interpreted and is often equated with the term »involved patient«. It is necessary to become aware that by transferring the responsibility, respectively, by sharing the responsibility every participant benefits from something in the process of health treatment.

Key words: patient, involvement, empowerment, medical treatment, physiotherapy.

Literatura/References:

1. Logar V, Turk K, Šubic A, Tetičkovič Ranfl M, Petek Uhan M, Blažević M idr. (2007). Vključevanje bolnikov v lastno zdravljenje (Raziskovalno poročilo). http://www.drmed.org/javne_datoteke/novice/datoteke/13308-SESTAVA.pdf. <23. 6. 2013>.
2. Burke D (2012). Specification of tools and services supporting patient empowerment (Raziskovalno poročilo). http://p-medicine.eu/fileadmin/p-medicine/public_website/downloads/p-medicine_270089_D2_5_Specification_of_tools_and_services_supporting_patient_empowerment_v3-0.pdf. <6. 7. 2013>.
3. Pesjak K (2007). Komunikacija bolnika in zdravnika. V: Vključevanje bolnika v zdravljenje. Družinska medicina 2007. Ljubljana: Združenje zdravnikov družinske medicine SZD, 38–43.
4. Tušek-Bunc, K. (2007). Spoštovanje partnerskega odnosa bolnik - zdravnik zaupnost v partnerskem odnosu. V: Vključevanje bolnika v zdravljenje. Družinska medicina 2007. Ljubljana: Združenje zdravnikov družinske medicine SZD, 4–9.
5. Fras, Z. in Maučec Zakotnik, J (2009). Vplivi in načini spreminjanja življenjskega sloga na srčno-žilno ogroženost. V: XVIII. Strokovni sestanek Sekcije za arterijsko hipertenzijo. Ljubljana: Slovensko zdravniško društvo, sekcija za arterijsko hipertenzijo, 37– 60.

Fizioterapevtska mreža osnovne zdravstvene dejavnosti od leta 2004 do 2014

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Uvod: V osnovni zdravstveni dejavnosti se problematika mreže pokritosti s fizioterapevtsko dejavnostjo kaže v oteženem dostopu zavarovanih oseb do storitev kot tudi v preveliki obremenjenosti fizioterapevtov posameznih območnih enot. **Metode:** V analizi so zajeti celotna populacija zavarovanih oseb in vsi izvajalci fizioterapije v osnovnem zdravstvenem varstvu od leta 2004 do 2014. Porazdelitev zavarovanih oseb, fizioterapevtskih programov in obremenjenosti posameznega fizioterapevta je prikazana v desetih območnih enotah Zavoda za zdravstveno zavarovanje Slovenije. **Rezultati:** Zavod za zdravstveno zavarovanje je korekcijo programov izvedel šestkrat. Analiza podatkov celotnega obdobja je pokazala 5-odstotno rast števila zavarovanih oseb in 22-odstotno povečanje števila fizioterapevtskih programov. Primerjava med posameznimi območnimi enotami prikazuje tudi do 100-odstotno razliko v obremenjenosti fizioterapevtov, ki v celotnem raziskovalnem obdobju ne kaže trenda po izenačitvi. Koeficient korelacije po Pearsonu med razliko v številu zavarovanih oseb in fizioterapevtskimi programi kaže le šibko medsebojno povezanost (0,25). **Zaključek:** Dobljeni rezultati nedvomno kažejo, da se stanje v mreži pokritosti s fizioterapevtsko dejavnostjo na področju osnovnega zdravstvenega varstva ne izboljšuje. Za načrtovalce korekcije programov sprememba v številu zavarovanih oseb v preteklosti ni bila najpomembnejši dejavnik. Mrežo fizioterapevtskih programov bi bilo v prihodnje treba postaviti na načelih, ki bi zagotavljali enakost tako za uporabnike kot tudi za izvajalce.

Ključne besede: zavarovane osebe, območne enote, mreža fizioterapevtske dejavnosti, obremenjenost, korelacija.

Physiotherapy network in primary health care in the period 2004–2014

Introduction: In the field of primary health care, the problems of the network of physiotherapeutic activity coverage are reflected in an aggravated access to services for insured persons and in excessive workload for physiotherapists in several regional units. **Methods:** The analysis comprises the total population of insured persons and all physiotherapy practitioners in the field of primary health care within the period 2004–2014. The distribution of insured persons, physiotherapeutic programmes and individual physiotherapists' workloads are presented in ten regional units of the Health Insurance Institute of Slovenia. **Results:** The Health Insurance Institute of Slovenia has performed six corrections of programmes. An analysis of data for the entire period of time showed a 5% increase in the number of insured persons and a 22% increase in the number of physiotherapeutic programmes. A comparison between separate regional units showed differences in individual therapists' workloads amounting up to 100%, and in the entire research period no trend towards balancing can be seen. The Pearson correlation coefficient between the number of insured persons and the physiotherapeutic programmes shows only a feeble connection (0.25). **Conclusion:** The obtained results undoubtedly show that the situation in the network of physiotherapeutic activity coverage in the field of primary health care is not improving. In the past a change in the number of insured persons was not seen as a key factor by the planners of programme corrections. In future the physiotherapy programme network should be based on principles ensuring equality both for users and practitioners.

Key words: insured persons, regional units, physiotherapeutic activity network, workload, correlation.

Literatura/References:

1. Zavod za zdravstveno zavarovanje Slovenije (-2004, številka 1). Podatki o obveznem zdravstvenem zavarovanju: 3.
2. Zavod za zdravstveno zavarovanje Slovenije (-2005, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
3. Zavod za zdravstveno zavarovanje Slovenije (-2006, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
4. Zavod za zdravstveno zavarovanje Slovenije (-2007, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
5. Zavod za zdravstveno zavarovanje Slovenije (-2008, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
6. Zavod za zdravstveno zavarovanje Slovenije (-2009, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
7. Zavod za zdravstveno zavarovanje Slovenije (-2010, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
8. Zavod za zdravstveno zavarovanje Slovenije (-2011, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
9. Zavod za zdravstveno zavarovanje Slovenije (-2012, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
10. Zavod za zdravstveno zavarovanje Slovenije (-2013, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
11. Zavod za zdravstveno zavarovanje Slovenije (-2014, številka 3). Podatki o obveznem zdravstvenem zavarovanju: 2.
12. Področni dogovor za zdravstvene domove in zasebno zdravniško dejavnost za pogodbeno leto 2004. <http://www.zzzs.si/zzzs/info/egradiva.nsf/o/444B79D2D07AFE6CC1256E9E004262DB?OpenDocument> <15. 3. 2015>.
13. Področni dogovor za zdravstvene domove in zasebno zdravniško dejavnost za pogodbeno leto 2005. <http://www.zzzs.si/zzzs/info/egradiva.nsf/o/EA816092343114AC12570500025DE81?OpenDocument> <15. 3. 2015>.
14. Področni dogovor za zdravstvene domove in zasebno zdravniško dejavnost za pogodbeno leto 2006. <http://www.zzzs.si/zzzs/info/egradiva.nsf/o/F4517E7D0ED5A6F8C12571AF003DE70E?OpenDocument> <15. 3. 2015>.
15. Zavod za zdravstveno zavarovanje Slovenije (-2007, številka 3). Občasnik: 13.
16. Zavod za zdravstveno zavarovanje Slovenije (-2008, številka 3). Občasnik: 8–29.
17. Zavod za zdravstveno zavarovanje Slovenije (-2009, številka 3). Občasnik: 90–104.
18. Splošni dogovor za pogodbeno leto 2010. <http://www.zzzs.si/zzzs/info/egradiva.nsf/obvestilo?readform&y=1&x=/zzzs/info/egradiva.nsf/o/9A5C83D33340B453C12576FD00468384> <15. 3. 2015>.
19. Splošni dogovor za pogodbeno leto 2011. <http://www.zzzs.si/zzzs/info/egradiva.nsf/o/C90374414A174BE7C1257810004666C0?OpenDocument> <15. 3. 2015>.
20. Zavod za zdravstveno zavarovanje Slovenije (-2012, številka 2/1. del). Občasnik: 99–115.

Šestminutni test hoje v bazenu pri obravnavi pacientov s kronično razširjeno nerakavo bolečino na URI - Soča – poročilo o primeru

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Uvod: Kronično razširjen bolečinski sindrom prizadene mehko tkivne strukture. Sprožijo ga bolečinski in nebolečinski dražljaji, pri čemer se čutne zaznave v osrednjem živčevju nepravilno procesirajo (1), zato so bolnikove psihofizične sposobnosti močno zmanjšane. Zdravljenje je dolgotrajen in večplasten proces, v katerem se poudarja multidisciplinaren pristop z načeli interdisciplinarnosti. Od leta 2013 na URI - Soča potekata dva programa za obravnavo oseb s kronično razširjeno nerakavo bolečino: 4-tedenski prilagojeni interdisciplinarni rehabilitacijski program (PIRP) in 5-tedenski interdisciplinarni program funkcionalne obnove (IPFO). Progresivna vadba v vodi (2) in učenje sproščanja v njej (3) pomembno pripomoreta k izboljšanju pacientovega počutja. Za spremljanje pacientovega napredka in vrednotenje fizioterapevtskih postopkov v bazenu ni razvitih enostavnih testov (4), zato je namen poročila o primeru prispevka predstaviti 6-minutni test hoje v bazenu za oceno vzdržljivosti pacientov, vključenih v PIRP.

Metode: 45-letna pacientka s sindromom fibromialgije je bila vključena v 4-tedenski PIRP. Za oceno vzdržljivosti smo izvedli 6-minutni test hoje v bazenu z osnovno analizo hoje (dolžina koraka, dostop, gibanje rok, koordinacija gibanja, drža telesa) pred začetkom PIRP-a in po njem. Pred testiranjem so bila dana kratka ustna navodila za izvedbo testa. Med izvajanjem je fizioterapevt spremljal pacientko ob bazenu in jo vsaki 2 minuti opozoril na preostanek časa. Test se je izvajal v bazenu, globokem od 120 do 140 cm in dolgem 15 m, s temperaturo vode od 31 do 33 °C. Ocena bolečine je bila izvedena pred začetkom in po koncu 6-minutnega testa hoje. Rezultati testa, ocena bolečine in osnovna analiza hoje so se zapisali v obrazec. Ob koncu programa so bili rezultati testiranja vključeni v končno fizioterapevtsko poročilo. **Rezultati:** Ob začetku programa je preiskovanka prehodila 85 m, ocena bolečine pred testom in po njem je bila 7/8; po koncu programa je prehodila 105 m z oceno bolečine 5/5,5. Primerjava pokaže, da je prehojena razdalja povečana za 23 odstotkov ob hkratnem zmanjšanju bolečine za 34 odstotkov.

Zaključki: 6-minutni test hoje v bazenu je enostaven za izvedbo in razumljiv. Dobro pokaže bolnikovo splošno telesno pripravljenost in njegovo osnovno gibanje po doprso globokem bazenu. Primeren je za spremljanje napredka bolnikov s kronično razširjeno nerakavo bolečino v času rehabilitacije. Na URI - Soča so rezultati 6-minutnega testa hoje vključeni v končno fizioterapevtsko poročilo. Test še ni standardiziran. V prihodnje bi bilo koristno test standardizirati, tako za ovrednotenje bolnikovega napredka kot za zapisovanje fizioterapevtskega dela v bazenu.

Ključne besede: 6-minutni test hoje v bazenu, hidroterapija, kronično razširjena nerakava bolečina.

Six-minute walk test in a swimming pool in a trial of patients with chronic widespread non-cancer pain in URI - Soča – case report

A chronic widespread syndrome affects soft-tissue structures and is caused by pain and non-pain irritation, which provokes false sensual perception in central nervous system (1). Because of that, the patient's psycho-physical capabilities are very weak. The treatment is long-lasting and often very comprehensive where the best results are achieved with multidisciplinary approach combined with interdisciplinary principles. In URI - Soča two interdisciplinary programmes for patients with chronic widespread non-cancer pain have been developed since 2013: 4-weeks' adapted interdisciplinary rehabilitation programme (PIRP) and 5-weeks' interdisciplinary programme of physical restoration (IPFO). Progressive exercising programme in water (2) and teaching of relaxation in it (3) help a lot to improve the patient's state of health. There are no easy tests in written form to evidence and to attend the patient's progress and the physiotherapist's work in pool, too (4). The purpose of the report was to present the 6-minute walk test in pool to assess the patient endurance in PIRP programme. **METHODS:** A 45-year-old woman was included in 4-weeks' PIRP. To assess the endurance, a 6-minute walking test in pool was used combined with basic walking analysis (step length, a touch of foot, an arm moving, a coordination of movement, a posture) before the beginning of the PIRP and after. Before starting the test, the patient was given short oral instructions; while walking the patient was attended from outside the pool by the physiotherapist, every 2 minutes, the patient was reminded about how much time was left. The test was done in a pool, which was 120 to 140 cm deep and 15 m long, with the water temperature 31°-33°C. Assessment of pain was done before and after the walking test. The results of each test, the pain assessment and the basic gait analysis were noted. At the end of the programme, all the results were included in the main physiotherapist's report. **RESULTS:** At the beginning of the programme, the included patient walked 85 m, the pain assessment was before/after the test 7/8. At the end of the programme, she walked 105 m and the pain was assessed 5/5.5. The comparison showed that the walking length increased for 23% and the pain decreased for 34%. The results of each test and the walking analysis were noted. At the end of the programme, everything was included in the physiotherapist's main report. **CONCLUSION:** The 6-minute walking test in a pool is an easily usable test. It showed the patient's endurance and his basic movement in a chest-deep pool well. It is suitable to assess the improvement of patients with chronic widespread non-cancer pain during their rehabilitation. In URI - Soča the results of the 6-minute walking test are included in the main physiotherapist's report. The standardisation hasn't been done yet. It is necessary to do the standardisation to evidence the patient's improvement and the physiotherapist's work as well.

Key words: 6-minute walk test in a pool, hydrotherapy, chronic widespread non-cancer pain.

Literatura/References:

1. Logar D (2007). Novosti v razumevanju patogeneze in zdravljenju sindroma fibromialgije. V: Rehabilitacija poškodovancev z nihajno poškodbo vratne hrbtenice: učna delavnica. Strokovno srečanje fizioterapevtov mariborske regije, Maribor, 19. april 2007. Maribor. Splošna bolnišnica, Oddelek za fizikalno in rehabilitacijsko medicino, 77-88.
2. Rosenstein AA, Water exercise for fibromyalgia: the gentle way to relax and reduce pain. Enumclaw, WA: Idyll Arbor, 2006.
3. Gangaway J (2011). Aquatic therapy supports fibromyalgia patients. <http://physical-therapy.advanceweb.com/features/Articles/Aquatic-Therapy-Supports-Fibromyalgia-Patients.aspx>. <8. 3. 2012>.
4. Klar N, Divjak M (2012). Program stopnjevane vadbe v vodi pri poskusni multidisciplinarni obravnavi sindroma fibromialgije. Diplomsko delo. Ljubljana: Zdravstvena fakulteta, Oddelek za fizioterapijo.

Zanesljivost meritev občutka za položaj zgornjega skočnega sklepa v odprti kinetični verigi

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Uvod: Občutek za položaj sklepa je pomemben del propriocepcije, ki prek specializiranih mehanoreceptorjev posreduje informacije o dejanskem položaju telesnih segmentov (1). Ker je oslabitev propriocepcije lahko eden izmed prvih znakov razvoja nevroloških in mišično-skeletnih okvar (2), je za njeno ocenjevanje treba zagotoviti zanesljivost merilne naprave in testnega postopka. Namen raziskave je bil ugotoviti zanesljivost meritev občutka za položaj zgornjega skočnega sklepa pri zdravih mladih preiskovancih, merjenega z elektrogoniometrom. **Metode:** V raziskavi je sodelovalo 30 zdravih preiskovancev (27 žensk, 3 moški), v povprečju starih $20,7 \pm 1,5$ leta. Za merjenje občutka za položaj sklepa je bil dvakrat v razmiku sedmih dni uporabljen elektrogoniometer Biometrics SG110, nameščen po poteku Ahilove tetive. Protokol je bil narejen na podlagi pregleda podobne raziskave (3). Vse meritve so preiskovanci opravili sede z zaprtimi očmi, na način aktivno pri 10° dorzalne fleksije ter 25° in 40° plantarne fleksije v zgornjem skočnem sklepu. Celoten postopek je trajal približno 20 minut. Izračunali smo absolutno razliko med doseženim in testnim kotom v sklepu ter absolutno napako. Iz absolutnih napak je bil izračunan intraklasni koeficient korelacije (ICC) in 95-odstotni interval zaupanja. **Rezultati:** Pri vseh kotih so se pri drugem merjenju absolutne napake zmanjšale. Povprečna vrednost absolutnih napak pri prvem merjenju je znašala $4,0^\circ$, pri drugem pa $3,3^\circ$. Največja razlika med absolutnimi napakami prvega in drugega merjenja je bila pri kotu 25° plantarne fleksije, pri katerem so bile pri prvem testiranju absolutne napake največje. Kot 25° plantarne fleksije se je tako izkazal za najmanj zanesljivega (ICC od 0,07 do 0,08). ICC pri 10° dorzalne fleksije je bil med 0,14 in 0,40. Najvišji ICC je bil pri 40° plantarne fleksije med 0,52 in 0,54, kar kaže na zmerno zanesljivost (4). **Zaključki:** Glede na rezultate lahko sklepamo, da meritve občutka za položaj zgornjega skočnega sklepa z elektrogoniometrom Biometrics SG110 niso dovolj zanesljive. Vir napak bi lahko bil protokol, merilna naprava, preiskovanci ali preiskovalec. Testni koti so za nekatere preiskovance predstavljali tudi njihovo končno mejo gibljivosti, zato so ta položaj težko dosegli in ga vzdrževali zahtevanih 5 sekund, s čimer se je povečala stopnja napak. Vir napak je lahko izbira tipa elektrogoniometra, nenatančna namestitvev in posledično težava pri določitvi ničelnega položaja ali premik kože med gibanjem. Razvidno je tudi, da so povsod pri ponovnem testiranju absolutne napake manjše, kar kaže na dejavnik učenja. Potrebne so dodatne raziskave za zagotovitev zanesljivega protokola za testiranje občutka za položaj zgornjega skočnega sklepa z elektrogoniometrom. Raziskava je potekala v okviru ARRS projekta L3-5509.

Ključne besede: zanesljivost, občutek za položaj zgornjega skočnega sklepa, elektrogoniometer, propriocepcija, odprta kinetična veriga.

Reliability of the talocrural joint position sense measurement in the open kinetic chain

Background: Joint position sense is one of the important parts of proprioception which provides information about the actual position of body segments through specialized mechanoreceptors (1). Since decline in proprioception may be one of the first signs of neurological and musculoskeletal impairment (2), proprioception requires a reliable measuring device and procedure for its evaluation. The purpose of the study was to determine the reliability of measurements of the talocrural joint position sense in healthy young subjects, measured by electrogoniometer. **Methods:** 30 healthy subjects (27 female, 3 male) an average age of 20.7 ± 1.5 years participated in the study. For measuring joint position sense, electrogoniometer Biometrics SG 110 was used twice in a seven-day interval. The electrogoniometer was placed over Achilles' tendon and a protocol described in the study by Bronner et al (3), was used. All measurements were made active (active) in a sitting position with eyes closed in three test angles: 10° dorsal-flexion, 25° and 40° plantar-flexion in the talocrural joint. Testing lasts approximately 20 minutes. Absolute differences between target and testing angle in the talocrural joint and absolute error were calculated. On the basis of absolute errors, the intraclass correlation coefficient (ICC) and a 95% confidence interval were calculated. **Results:** For all angles in the second measurement, absolute errors were smaller. Average of absolute errors in the first measurement was 4.0° and in the second measurement it was 3.3°. The largest differences in the absolute errors between the first and the second measurement were at 25° of plantar-flexion, where the absolute errors in the first measurement were the largest. The least reliable angle was 25° of plantar-flexion (ICC: 0.07–0.08). ICC at 10° of dorsal-flexion was between 0.14 in 0.40. The highest ICC (0.52–0.54) was at 40° of plantar-flexion, which shows moderate reliability (4). **Conclusions:** According to the results, it can be concluded that measurement of talocrural joint position sense using electrogoniometer Biometrics SG110 is not reliable. The source of errors could be the measurement protocol itself, the device, subjects or the tester. In some subjects, testing angles were at the end range of their motion and therefore, it was difficult to reach and maintain this position for 5 seconds, which caused an increase in error. The possible source of errors could be the type of electrogoniometer, imprecise placing and consequently difficulty to determine null position or skin movement. It is evident, that in all re-tests the absolute errors were decreased, which indicates learning process. Further research is required to establish a reliable protocol for measuring the ankle joint position sense using electrogoniometer. The research was made according to the ARRS project L3-5509.

Key words: reliability, talocrural joint position sense, electrogoniometer, proprioception, open kinetic chain.

Literatura/References:

1. Olsson L, Lund H, Henriksen M, Rogind H, Bliddal H, Danneskiold-Samsøe B (2004). Test-retest reliability of a knee joint position sense measurement method in sitting and prone position. *Adv Physiother* 6 (1): 37–47.
2. Deshpande N (2001). Reliability and sensitivity of ankle proprioceptive measures. Master's thesis. Kingston: Queen's University.
3. Bronner S, Agraharasamakulam S, Ojofeitimi S (2010). Reliability and validity of a new ankle electrogoniometer. *J Med Eng Technol* 34 (5–6): 350–55.
4. Juul-Kristensen B, Lund H, Hansen K, Christensen H, Danneskiold-Samsøe B, Bliddal H (2008). Test-retest reliability of joint position and kinesthetic sense in the elbow of healthy subjects. *Physiother Theory Pract* 24 (1): 65–72.

Svetlobna terapija pri artrozah

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Več kot 80 odstotkov ljudi ima vsaj enkrat v življenju težave z osteoartritisom. LLLT (low level light therapy – nizkoenergijska svetlobna terapija) je nov pristop za zdravljenje številnih medicinskih stanj, pri katerih je treba zmanjšati bolečino in vnetje, spodbuditi zdravljenje in preprečiti tkivno smrt po poškodbi ali infarktu. Fotoni rdeče ali NIR-svetlobe se absorbirajo v citokrom c oksidazi (encim respiratorne verige v mitohondrijih), kar vodi v povečano sintezo ATP in sprožitev signalnih poti. V več študijah so ugotavljali protivnetne učinke LLLT in ugotovili zmanjšanje vnetnih celic (nevtrofilci, makrofagi, limfociti, mastociti) in vnetnih citokinov (interlevkin 1, TNF- α). LLLT se klinično uporablja že več let. V številnih študijah na živalskih modelih in ljudeh je bilo ugotovljeno, da obsevanje z LLLT vpliva na proliferacijo in sekrecijo hondrocitov, zmanjšuje bolečine in izboljša obseg gibanja. LLLT se uporablja kot metoda biostimulacije. Rezultati različnih študij se med seboj razlikujejo in so odvisni od parametrov, kot so valovna dolžina, energijska gostota moči, število in trajanje zdravljenja ter velikost obsevanega predela. Mehanizmi delovanja LLLT na hrustanec še vedno niso točno znani. Verjetno delujejo na proliferacijo hondrocitov in sekrecijo ekstracelularnega matriksa. Fototerapija zmanjša vnetje in bolečine ter izboljša gibljivost sklepov in tako prispeva k boljši kakovosti življenja. Obsevanje z LED ima nekaj prednosti pred terapijo z laserjem. LED emitirajo svetlobo v več valovnih dolžinah hkrati in tako lahko stimulirajo več dejavnikov zdravljenja. Obsevamo lahko več vrst različnih tkiv in večje površine tkiva (sklepi, mišice). So veliko cenejše in imajo daljšo življenjsko dobo. Prav od uporabe pravih svetlobnih parametrov je odvisen učinek zdravljenja.

Ključne besede: osteoartroza, obsevanje z LED, fotobiomodulacija, nizkoenergijska terapija z laserjem, nizkoenergijska svetlobna terapija.

Light Therapy in Arthrosis

More than 80% of people have problems caused by osteoarthritis at least once in their life. LLLT (low level light therapy) is a new way to treat a lot of medical conditions, where it is necessary to reduce pain and inflammation, stimulate healing and prevent tissue death after injury or infarct. Photons of red or NIR light are absorbed in the cytochrome c oxidase (enzyme in mitochondrial respiratory chain), leading to an increased synthesis of ATP and initiate signalling pathways. Several studies examined the anti-inflammatory effects of LLLT and a decrease in inflammatory cells (neutrophils, macrophages, lymphocytes, mast cells) and the reduction of proinflammatory cytokines (interleukin 1, TNF- α). LLLT has been clinically used for many years. In several animal and human studies, it has been found that irradiation with LLLT affects the proliferation and secretion by chondrocytes, attenuates pain and improves the rate of motion. LLLT is used as a method of biostimulation. The results of the various studies differ and depend on parameters such as wavelength, energy density power, the number and duration of treatment, and the size of the irradiated area. Mechanisms of LLLT effect on the cartilage is still not known exactly. It is likely, that it acts on the proliferation of chondrocytes and secretion of extracellular matrix. Phototherapy has an effect on reducing inflammation and pain, improves flexibility of joint, thereby contributing to a better quality of life. Irradiation by LED has several advantages over laser therapy. LEDs emit light in the longer wavelengths at the same time and can also stimulate a number of factors of treatment. You can irradiate several different types of tissue and larger areas of tissue (joints, muscles). They are much cheaper and have a longer life. It is precisely the use of correct lighting parameters, that the treatment effect depends on.

Key words: osteoarthritis, LED-light emitting diode irradiation, photobiomodulation, low level light therapy, low level light therapy.

Literatura/References:

1. Hamblin MR (2013). Can osteoarthritis be treated with light? *Arthritis research & Therapy*, 15: 120.
2. Weston J (2006). Effects of Light on Osteoarthritis and Cartilage Repair, BioCare Systems, Inc. <http://www.betterbraces.com/media/Effects%20of%20Light%20Therapy%20on%20Cartilage%20Repair%20and%20Osteoarthritis%20Healing.pdf>. <15. 3. 2015>.
3. Frangež I, Kuralt T, Ban-Frangež H, Smrke DM (2012). Symptomatic therapy of mild to moderate osteoarthritis of the knee with light emitting diode. *Photodiagnosis and Photodynamic therapy* 9 (Suppl 1): S32(94).
4. Alghadir A, Omar MTA, Al-Askar AB, Al-Muteri NK (2014). Effect of low-level laser therapy in patient with chronic osteoarthritis: a single-blinded randomised study. *Laser Med Sci* 29: 749–55.

Zdravje na delovnem mestu

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Uvod: V prispevku prikažemo preventivni izobraževalni program Zdravje na delovnem mestu, katerega namen je ohraniti prožno in zdravo hrbtenico za zdravo telo za delo in življenjske aktivnosti. Premalo fizične aktivnosti in skrbi za mišično moč, gibljivost in koordinacijo je najpogostejši vzrok za bolečino v hrbtenici, zato je vsebina programa usmerjena v motiviranje udeležencev za aktivno življenje in športne aktivnosti. Že leta 1958 je v Kanadi dr. Fahrni (1) razvil koncept edukacije za svoje paciente. Razvil je več tehnik za sprostitvev, mehaniko gibanja, razbremenilne položaje in edukacijo obvladovanja bolečine v hrbtenici. Leta 1969 je nastala Švedska šola proti bolečini v hrbtenici v tovarni Volvo (2). Model je bil zelo uspešen pri vračanju delavcev na delovno mesto. Znano je, da je za paciente, ki v enem ali dveh mesecih ne zmanjšajo bolečine, bolj verjetno, da razvijejo kronično bolečino (3). **Metode dela:** Leta 2011 smo preventivne izobraževalne programe vključili v delovne organizacije Zavod za zaposlovanje RS, Zavarovalnico Triglav in Domel v obliki delavnice. Vsebina delavnice se je prilagajala glede na način dela udeležencev, ki ga opravljajo. Delavnice so trajale dve uri. Zdravnica je predstavila uvodni del namena raziskave, fizioterapevtka preventivo na delovnem mestu in praktično izvedbo vaj, delovna terapevtka pa ergonomsko urejenost na delovnem mestu. Fizioterapevtski del delavnice temelji na vsebini Šole proti bolečini v hrbtenici, ki poteka v okviru fizioterapevtskih programov na URI - Soča od leta 1990. Vsebina je razdeljena v teoretični in praktični del. Cilji so zmanjšanje bolečine, preprečitev ponovne epizode bolečine v hrbtenici in aktivna skrb za lastno hrbtenico. Teoretični del vsebuje anatomijo in funkcijo hrbtenice, biomehaniko gibanja pri gibanju v različnih položajih, optimalno držo in ergonomijo. Praktični del pa vsebuje učenje pravilne drže, vzravnane drže pri sedenju, pravilnega pobiranja bremen, razbremenilnih položajev, samovleka in tehnike samopomoči, vaje za sproščanje in stabilizacijo ter vaje za moč, gibljivost in koordinacijo. **Rezultati:** Od leta 2011 je bilo v izobraževanje vključenih 1384 udeležencev iz različnih delovnih organizacij. V anketi udeleženci navajajo visoko zavedanje, da je znanje za ohranjanje zdravja pri delu pomembno (povprečna ocena 4,77 od 5), da je bila delavnica dobra in vsebina primerno izbrana glede na njihove potrebe na delovnem mestu (4,6) in da je bilo sodelovanje na delavnici koristno (4,75). **Zaključki:** Preventivni programi v delovnih organizacijah s prilagojeno vsebino glede na njihove potrebe in način dela so se pokazali kot zelo uspešni in so spodbuda k aktivni skrbi za zdravje na delovnem mestu.

Ključne besede: fizioterapija, izobraževanje, preventiva, delovno okolje, vadba.

Health in the work place

Introduction: In this paper we present the preventive education program »health in the work place« to keep flexible and healthy spine for a healthy body for work and life activities. Lack of physical activities and care for muscle strength, flexibility and balance are the most common causes of back pain. For this reason, the program is aimed at motivating participants for an active life style and sporting activities. In 1958 dr. Fahrni (1) in Canada developed the concept of educating his patients. He developed a lot of techniques for relaxing, movement, resting positions, and training in managing back pain. In 1969 the Swedish Low Back School was developed in the Volvo factory (2). This model was very successful in returning workers to their jobs. It is known that in patients that do not reduce pain in one or two months' time probability of developing chronic pain is a lot bigger (3). **Methods:** In 2011 we prepared the preventive educational program for work organisations Zavod za zaposlovanje RS, Zavarovalnica Triglav and Domel in the form of workshops which are customized based on the work environment and work done. Workshops last 2 hours. A doctor presents the introduction, a physical therapist presents preventive measures and practical execution of exercises, and an occupational therapist presents ergonomics in the work place. The physical therapist's part is based on the Back school program that has been implemented at URI-Soča since 1990. The content is divided into theoretical and practical parts. Goals are to reduce pain, prevent re-occurrence and care of the spine. The theoretical part includes anatomy and function of the spine, biomechanics of movement in various positions, optimal posture and ergonomics. The practical part includes correct posture training, good posture while sitting, correct ways to pick up loads, resting positions, auto traction and self-help, and exercises for relaxation, stabilization, strength, flexibility and balance. **Results:** Since 2011, 1384 employees from various work organisations have attended these workshops. The survey's results show that participants had high awareness that knowing how to keep healthy in the work place is important (average 4.77 out of 5), that the workshop was suitable and the content appropriate considering their work place (4.60), and that participation in the workshop was beneficial (4.75). **Conclusions:** Preventive programs in work organizations where the content is customized based on their needs and work environment have shown to be very beneficial and encourage employees to be active and care for maintaining health in the work place.

Key words: physiotherapy, education, prevention, work place, exercise.

Literatura/References:

1. White AH (1983). Back School and other conservative approaches to low back pain, 44–5.
2. Heymans MW (2014). Back School for acute and subacute non specific low-back pain (Protokol); The cochrane colaboratin, 1–2.
3. Waddell GA (1987). A new clinical model for the treatment of low back pain. Spine 12: 32–44.

Funkcijska zmogljivost hospitaliziranih starejših oseb

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Uvod: Krhkost ni bolezensko stanje, temveč sindrom, ki ga sestavlja skupek simptomov in znakov. Ti simptomi napovedujejo izid zdravstvenega stanja in služijo kot ocena bolnikovega splošnega zdravstvenega stanja (1). Številne študije navajajo različne definicije za označevanje sindroma pri starejših oseb, kot najpogostejši klinični kazalniki sindroma pa se navajajo zmanjšana mobilnost, motnja ravnotežja, zmanjšana mišična zmogljivost, slabši prehranski status in zmanjšana telesna dejavnost (2). Namen raziskovalne študije je predstaviti funkcijsko sposobnost hospitaliziranih starejših oseb ob sprejemu in odpustu, poleg tega pa tudi predstaviti razliko med spoloma v funkcijski sposobnosti.

Metode: V raziskavo je bilo vključenih 99 pacientov, hospitaliziranih na oddelku klinike Center za vojne veterane. Povprečna starost žensk je bila 81,8 (8,0) leta, moških pa 78,8 (9,4) leta. Za predstavitev rezultatov smo uporabili deskriptivne statistične metode. Povezanost med posameznimi spremenljivkami smo ugotavljali s koeficientom korelacije (r) po Pearsonu. Pri postopni multipli regresiji smo predpostavili, da so odvisne spremenljivke (izidi) testi, ki smo jih opravili na koncu hospitalizacije. Ti so relativna zmogljivost prijema glede na telesno težo, funkcijska zmogljivost, ki smo jo ocenili z indeksom Barthel (BI), in hitrost hoje. Za merjenje hitrosti hoje smo uporabili kronometer (JUNOS-230, Shenzhen Junsu Electronic Co, Kitajska) in lepilni trak, s katerim smo označili razdaljo štirih metrov. Za oceno prehranjenosti je bila uporabljena mini prehranska anamneza. Statistično pomembnost razlik med spoloma smo določali s Studentovim testom in Mann-Whitneyjevim testom ($p < 0,05$).

Rezultati: Relativna zmogljivost prijema ob odpustu je bila statistično značilno ($p < 0,0001$) pozitivno povezana z relativno zmogljivostjo prijema ob sprejetju in negativno povezana s telesno težo. BI ob odpustu je bil statistično značilno ($p < 0,001$) pozitivno povezan z BI ob sprejetju, programom fizioterapije in mini prehransko anamnezo. Hitrost hoje ob odpustu je bila statistično značilno ($p < 0,001$) pozitivno povezana z BI ob sprejemu, s programom fizioterapije in z relativno zmogljivostjo prijema ob sprejetju, negativno pa je bila povezana s starostjo pacientov. V povprečju so bili moški višji in težji, zato je bil tudi njihov energetski vnos hrane statistično značilno višji ($p = 0,003$), v povprečju za 243,2 kcal. BI je bil ob sprejemu pri moških v primerjavi z ženskami statistično značilno višji ($p = 0,028$), v povprečju za 2,9 točke, ob odpustu pa je bil pri ženskah višji v povprečju za 2,0 točki. Moški so imeli v povprečju statistično značilno višji rezultat relativne zmogljivosti ob sprejetju ($p < 0,0001$), povprečno za 0,09 kg/kgTT, od žensk, ob odpustu je bila relativna zmogljivost pri moških statistično značilno višja ($p = 0,006$), povprečno za 0,07 kg/kgTT. Moški so bili v povprečju statistično značilno hitrejši ($p = 0,022$), v povprečju za 0,17 m/s.

Zaključki: Pridobljeni podatki o funkcijskem stanju pacientov nam dajejo orientacijsko oceno pacientove samostojnosti pri opravljanju vsakodnevnih opravil. Glede na to, da so bili v povprečju moški višji in težji, je bil tudi njihov energetski vnos hrane statistično značilno višji. Ob sprejemu je bila relativna zmogljivost prijema pri moških statistično značilno višja od relativne zmogljivosti prijema žensk, prav tako je bilo tudi ob odpustu. Relativna zmogljivost prijema na koncu hospitalizacije je bila statistično značilno pozitivno povezana z relativno zmogljivostjo prijema ob sprejetju in negativno povezana s telesno težo. BI ob sprejemu je bil v primerjavi z ženskami statistično značilno višji pri moških. Barthelov indeks na koncu hospitalizacij kot kazalnik funkcijske zmogljivosti je bil statistično značilno pozitivno povezan z Barthelovim indeksom ob sprejetju, programom fizioterapije in mini prehransko anamnezo. Moški so bili v povprečju statistično značilno hitrejši od žensk. V naši raziskavi je bila hitrost hoje na koncu hospitalizacije statistično značilno pozitivno povezana z Barthelovim indeksom ob sprejetju, programom fizioterapije in relativno zmogljivostjo prijema ob sprejetju, negativno pa je bila povezana s starostjo pacientov.

Ključne besede: sindrom krhkosti, staranje, sarkopenija, nezmožnost, telesna dejavnost.

Functional ability of hospitalized elderly persons

Introduction: Fragility is not a condition of illness, but a group of symptoms and signs, which define the fragility syndrome or physical weakness. These indicators predict the result of a health condition or in other words serve as a general assessment of a patient's health condition. Numerous studies report a different definition of frailty syndrome. These are reduced grip capacity, exhaustion, unexplained weight loss, reduced walking speed and reduced physical activity. These indicators predict the result of health condition or in other words serve as a general assessment of a patient's health condition. The aim of the research study report is to present functional ability of hospitalized elderly persons. The second aim is to present the difference between sexes in functional ability. **Methods:** The research included 99 patients, hospitalized in the section of Center za vojne veterane. The average age of women was 81.8 (8.0) years, and of men 78.8 (9.4) years. We used descriptive statistical methods to present the results. The connection between individual variables was determined with Pearson's correlation coefficient (r). At the gradual multiple regression analysis we assumed that the dependent variables (results) were the tests which were performed in the end of hospitalization. These are grip capacity and functional capacity, which were assessed with the Barthel index and walking speed. Walking speed was measured with chronometer and the masking tape was used to mark the distance of four meters. To assess the nutritional status, Mini nutritional assessment was used. The statistical importance of sex differences was determined with the Student's test and Mann-Whitney test ($p < 0.05$). **Results:** Relative grip capacity (RZP2) at the time of remission was statistic-wise typically ($p < 0.0001$) positively related to the relative grip capacity at the time of admission (RZP1) and negatively related to physical weight (TT). Remission BI (BI2) was statistic-wise typically ($p < 0.001$) positively correlated to admission BI (BI1), physiotherapy programme (FT) and mini nutritional assessment (MNA). The walking speed (HH) at the time of remission (BI2) was statistic-wise typically ($p < 0.001$) positively related to BI at the time of admission (BI1), physiotherapy programme (FT), relative grip strength at the time of admission (RZP1) and negatively correlated to the patients' age (S). In average, men were taller and heavier and consequently their food energy intake was statistic-wise typically higher ($p = 0.003$), for 243.2 kcal on average. The admission BI was in comparison to women statistic-wise typically higher at men ($p = 0.028$), for 2.9 points on average, whereas the remission BI at women was higher for 2.0 points on average. On average, men had a statistic-wise typically higher result of the relative capacity when admitted ($p < 0.0001$), on average for 0.09 kg/kgTT, than women, and when dismissed the male relative capacity was statistic-wise typically higher ($p = 0.006$), for 0.07 kg/kgTT on average. On average, men were statistic-wise typically faster ($p = 0.022$), for 0.17 m/s on average. **Conclusion:** The obtained data about the patients' functional condition gave us an approximate assessment of patient's independence at performing daily chores. On average, men were taller and heavier and consequently their food energy intake was statistic-wise typically higher. Upon acceptance, men had a statistic-wise typically higher result of the relative capacity than women, the same was true at discharge. Relative grip capacity at the time of remission was statistic-wise typically positively related to the relative grip capacity at the time of admission and negatively related to physical weight. The admission BI was in comparison to women statistic-wise typically higher at men. Remission BI was statistic-wise typically positively connected to admission BI, physiotherapy programme and mini nutritive anamnesis. On average, men were statistic-wise typically faster. Walking speed at the time of remission was statistic-wise typically positively related to BI at the time of admission, physiotherapy programme and relative grip capacity at the time of admission. It was negatively related to the patients' age.

Key words: fragility syndrome, ageing, sarcopenia, incapacity, physical activity.

Literatura/References:

1. Evans WJ, Paolisso G, Abbatecola AM et al (2010). Frailty and muscle metabolism dysregulation in the elderly. *Biogerontology*, 11: 527–36.
2. Fried LP, Walston J (2003). Frailty and failure to thrive. In: *Principles of Geriatric Medicine and Gerontology*. 5th Ed. Hazzard WR, Blass JP, Ettinger WH Jr, Halter JB, Ouslander J, eds. New York: McGraw-Hill; 1487–502.
3. Veninšek G (2011). Kako do optimalne oskrbe v bolnišnici – Celostna geriatrična ocena. V: Mencej M. *Bolezni in sindromi v starosti*. Ljubljana: Gerontološko društvo Slovenije, 91–112.

Takojšnji učinki masaže stopala na statično ravnotežje pri zdravih mladih preiskovancih

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Uvod: Predvideva se, da različne senzorne spodbude preko stopal, bodisi z masažo ali z vibracijami, vplivajo na izboljšanje ravnotežja (1). Namen raziskave je bil ugotoviti takojšnje učinke 5-7 minutne klasične terapevtske masaže stopala in gležnja na statično ravnotežje zdravih mladih preiskovancev. **Metode:** Testiranih je bilo 80 (71 žensk in 9 moških) preiskovancev, povprečne starosti 22,9 ($\pm 2,0$) let, s povprečnim indeksom telesne mase 21,6 ($\pm 2,4$). Po začetni izvedbi testa stoje na eni nogi na trdi podlagi z odprtimi in zaprtimi očmi (2) in na mehki podlagi z odprtimi in zaprtimi očmi (3), izmenično na eni in drugi nogi, smo masirali stopalo in gleženj ene noge po postopku, ki sta ga opisali Holey in Cook (4). Da bi zmanjšali učinek učenja in dominantnosti noge, smo nogo, ki je bila masirana in testirana, določili z žrebom. Po masaži smo ocenjevanje ravnotežja ponovili na masirani in nemasirani nogi. Naslednji dan smo celotni postopek ponovili, le da smo masirali drugo nogo. Za primerjavo povprečnih in najdaljših časov stoje podatkov pred in po masaži smo uporabili parni test t za odvisne vzorce. **Rezultati:** Pri testnem pogoju stoje na eni nogi na trdi podlagi z odprtimi očmi so preiskovanci že pred masažo dosegli najdaljši čas testa (45 sekund). Pri vseh drugih testnih pogojih so bili povprečni in najdaljši časi stoje preiskovancev po masaži višji kot pred masažo. Primerjava povprečnega časa stoje preiskovancev na masirani nogi pred masažo in po masaži je pokazala statistično pomembno izboljšanje na trdi podlagi z zaprtimi očmi prvi ($p \leq 0,01$) in drugi dan ($p \leq 0,01$), na mehki podlagi z odprtimi očmi samo prvi dan ($p \leq 0,05$) ter na mehki podlagi z zaprtimi očmi prvi ($p \leq 0,01$) in drugi dan ($p \leq 0,01$). Primerjava najdaljših časov stoje preiskovancev na masirani nogi pred masažo in po masaži je pokazala statistično pomembne razlike na trdi podlagi z zaprtimi očmi prvi ($p \leq 0,01$) in drugi dan ($p \leq 0,01$) ter na mehki podlagi z zaprtimi očmi prvi ($p \leq 0,01$) in drugi ($p \leq 0,05$) dan. Pri stoji na mehki podlagi z odprtimi očmi, statistično pomembnih razlik nismo ugotovili, ne prvi niti drugi dan. Pri stoji na nogi, ki je nismo masirali, nismo ugotovili statistično pomembnih razlik pri nobenem testnem pogoju niti prvi, niti drugi dan. **Zaključki:** Masaža stopala je vplivala na takojšnje izboljšanje statičnega ravnotežja pri stoji na eni nogi na trdi in mehki podlagi z zaprtimi očmi. Predvidevamo, da je na izboljšanje stoje na eni nogi po masaži vplival zvečan priliv iz receptorjev za dotik in pritisk ter proprioceptorjev s področja stopala in gležnja. Pri testnem pogoju na mehki podlagi z odprtimi očmi je bil učinek masaže manjši, saj se pri uravnavanju ravnotežja, ko postanejo somatosenzorne informacije manj zanesljive, zanašamo predvsem na vidni priliv (5). Obstaja potreba po raziskovanju kratkoročnih in dolgoročnih učinkov različnih somatosenzoričnih spodbud na izboljšanje ravnotežja pri zdravih in pri pacientih.

Ključne besede: ravnotežje, stoji na eni nogi, masaža gležnja in stopala.

The immediate effects of foot massage on static balance in young healthy subjects

Background: It is assumed that various sensory stimulations of feet, either massage or vibrations, can improve balance (1). The purpose of the study was to investigate immediate effects of 5-7 minute classical therapeutic massage of foot and ankle on static balance of healthy young subjects. **Methods:** A total of 80 subjects (71 females and 9 males), with mean age 22,9 (\pm 2,0) years, average body mass index 21,6 (\pm 2,4), were included in the study. Following one-leg stance test on firm surface with eyes open and closed (2), and on a compliant surface with eyes open and closed (3) with each leg, one foot was massaged according the described protocol (4). To minimise learning and dominance effect the leg which was tested and massaged first was determined by drawing lots. After massage of one foot, balance on each leg was tested again. The same testing procedure was repeated next day with massaging the other leg. The before and after massage average and maximal performance values were compared by a paired t-test for dependent patterns. **Results:** In one-leg stance test on firm surface with eyes open all subjects achieved the maximum testing time before the massage (45 sec). In all other testing conditions the average and maximal performance values of subjects increased after massage. The comparison of before and after massage data showed statistically significant improvement of average subject's performance time with the massaged leg stance on a firm surface with eyes closed on first and second day ($p \leq 0,01$; $p \leq 0,01$, respectively), on a compliant surface with eyes opened on first day only ($p \leq 0,05$), and on a compliant surface with eyes closed on first and second day ($p \leq 0,01$; $p \leq 0,01$, respectively). The comparison of maximal subject's values before and after the massage showed statistically significant differences for stance with the massaged leg on a firm surface with eyes closed on first and second day ($p \leq 0,01$; $p \leq 0,01$, respectively), and on a compliant surface with eyes closed on first and second day ($p \leq 0,01$; $p \leq 0,05$, respectively). No statistically significant difference was found for stance on a compliant surface with eyes opened neither on day one nor day two. For the non-massaged leg, no statistically significant difference was found in any of the test conditions. **Conclusions:** It can be concluded that foot massage had an immediate effect on improvement of balance during one-leg stance on firm and compliant surface with eyes closed. We anticipate that this is due to increased input from the receptors for light touch and pressure, and proprioceptors in the area of foot and ankle. In the test condition on a compliant surface with eyes open the effect of massage was minor, because balance control relies mainly on a visual input when somatosensory information becomes less reliable (5). There is a need for research of short- and long-term effects of different somatosensory stimulations on balance improvement in healthy people and patients.

Key words: balance, one-leg stance, ankle and foot massage.

Literatura/References:

1. Vaillant J, Rouland A, Martigne P, Braujou R, Nissen MJ, Caillat-Miousse JL, Vuillerme N, Nougier V, Juvin R (2009). Massage and mobilization of the feet and ankles in elderly adults: Effect on clinical balance performance. *Man Ther* 14 (6): 661–64.
2. Springer BA, Marin R, Cyhan T, Roberts H, Gill NW (2007). Normative values for the unipedal stance test with eyes open and closed. *J Geriatr Phys Ther* 30 (1): 1–7.
3. Emery CA, Cassidy JD, Klassen TP, Rosychuk RJ, Rowe BB (2005). Development of a clinical static and dynamic standing balance measurement tool appropriate for use in adolescents. *Phys Ther* 85 (6): 502–14.

Terapija z ogledalom pri pacientu s fantomsko bolečino po amputaciji – poročilo o primeru

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Uvod: Večina pacientov po amputaciji uda poroča o občutenju manjkajočega uda. Od 60 do 90 odstotkov vseh pacientov po amputaciji naj bi poročalo tudi o fantomski bolečini. To je bolečina amputiranega uda, ki največkrat preide v kronično bolečino in jo je težko zdraviti (1). Pacienti jo opisujejo kot krčevito, intenzivno in pekočo bolečino ter kot občutek nenormalnega položaja uda (2, 3). Fantomska bolečina pomembno zmanjšuje kakovost življenja teh oseb. Pri zdravljenju se uporabljajo zdravila in različne metode fizioterapije, tudi terapija z ogledalom. Na podlagi Ramachandranove teorije o delovanju terapije z ogledalom lahko s primerno vidno povratno informacijo (odsev neokvarjenega uda) vplivamo na zaznavanje na ravni možganov in posledično zmanjšamo bolečino (4). Namen poročila o primeru je bil dokazati učinkovitost terapije z ogledalom na zmanjšanje fantomske bolečine pri pacientu po nadkolenski amputaciji. **Metode:** Sodeloval je 35-letni pacient dva meseca po nadkolenski amputaciji z vsakodnevno fantomsko bolečino. Z enim delom vprašalnika za oceno proteze (angl. ProsthesisEvaluationQuestionnaire – PEQ) je bila ocenjena fantomska bolečina pred začetkom, enkrat na teden ter po štirih tednih terapije z ogledalom. Pacient je imel dvajset 15-minutnih terapij. Terapijo je izvajal v polsedečem položaju z ogledalom med obema iztegnjenima spodnjima udoma. Pacient je v ogledalu opazoval zdravi ud ter izvajal gib dorzalne in plantarne fleksije stopala. Poleg te terapije je izvajal še druge fizioterapevtske postopke in prejemal protibolečinska zdravila. **Rezultati:** Po štiritedenski terapiji z ogledalom se je fantomska bolečina zmanjšala. Zmanjšala sta se pogostost bolečine (nekajkrat na dan) in njeno trajanje (od nekaj minut do ene ure). Bolečina je postala manj moteča, zmanjšala se je tudi njena intenzivnost. **Zaključek:** Terapija z ogledalom je zmanjšala jakost, čas trajanja in pogostost fantomske bolečine. Je lahko dostopna ter cenovno ugodna rešitev pri zdravljenju fantomskih bolečin po amputaciji uda in se lahko uporablja tudi v domačem okolju. Potrebne so nadaljnje raziskave s širšo skupino pacientov po amputaciji, ki ne bi prejemale druge protibolečinske terapije, da bi z dokazi podprli učinkovitost terapije z zrcalom na fantomsko bolečino.

Ključne besede: fantomski ud, amputacija, zdravljenje, vprašalnik PEQ, fantomske zaznave.

Mirror therapy in a patient with the phantom limb pain – case report

Background: After the limb amputation, most patients report awareness of a phantom limb. Additionally, 60-90% of amputees report the phantom limb pain. This is a sensation of pain located in the amputated limb, which has a high rate of chronicity and is difficult to treat (1). They describe it as an intensive, burning, cramping pain and feeling of the phantom limb in sustained uncomfortable positions (2, 3). The phantom pain significantly reduces the quality of an amputee's life. Various methods are used for the treatment of physical and medical therapy and mirror therapy. On the basis of Ramachandran theory about mechanisms of mirror therapy, we can influence with suitable visual feedback (reflection unaffected limb) on perception at the brain level and consequently reduce pain (4). The purpose of this case report was to show the effectiveness of mirror therapy on pain reduction in patients with the above-knee amputation. **Methods:** A 35-year-old man two months after amputation above knee had severe phantom limb pain. The part of Prosthesis Evaluation Questionnaire (PEQ) was used at the beginning, between and at the end of the mirror therapy. All 20 15-minute treatments were distributed to four weeks. The therapy was carried out in half-sitting position, with a mirror placed between the lower extremities. The amputated limb was placed behind the mirror. With the unaffected leg he did movements of dorsal and plantar flexion of the ankle. During the mirror therapy he had other physiotherapy procedures and pain medicament therapy. **Results:** After four weeks of mirror therapy, the phantom limb pain decreased. Distraction, strength and duration of the phantom limb pain were reduced (from several minutes to one hour). **Conclusions:** The mirror therapy has influence on reduction of intensity, incidence and duration of the phantom limb pain. It is an accessible and cost-effective method for pain reduction and can be used in home environment. Further research with a wider group with no additional therapies to reduce pain is necessary to demonstrate the efficacy of the mirror therapy.

Key words: phantom limb, amputation, treatment, PEQ-questionnaire, phantomsensations.

Literatura/References:

1. Foell J, Bodman BR, Diers M, Flor H (2014). Mirrortherapyforphantom limb pain: Brainchangesandthe role ofbodyrepresentation. *EJP* 18: 729–39.
2. Nicole EA, Souvlis T, Moseley GL (2007). Stroke, complexregionalpainsyndromeandphantomlimbpain: cancommonalitiesdirect future management?. *J Rehabil Med* 39: 104–14.
3. Ramachandran RD, Ramachandran VS (1996). Synesthesia in phantomlimsinducedwithmirrors. *TheRoyalSociety* 263: 377–86.
4. Puh U, Hlebš S (2013).Učinki in mehanizmi delovanja terapije z ogledalom-pregled literature. *Zdrav Vestn* 82: 410–18.

Krepitev mišic z elektrostimulacijo za izboljšanje funkcije pri osebah z okvaro zgornjega motoričnega nevrona

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Uvod: S krepitvijo mišic vplivamo na maksimalno silo, ki jo mišica lahko razvije. Zmožnost mišice ustvariti maksimalno silo se nanaša na mišično moč, ki predstavlja jakost mišice (1). Vadba za povečanje moči mora temeljiti na načelu nadobremenitve, kar pomeni, da mora predstavljati večji stres za telo, kot ga je telo sicer vajeno. To pomeni, da mora biti vadba zadovoljive intenzivnosti, frekvence in trajanja (2). Za pridobivanje mišične zmogljivosti obstaja več metod. Ena izmed njih je tudi električna stimulacija. Kots je že leta 1973 opisal vlogo električne stimulacije mišic pri povečanju mišične zmogljivosti. Trdil je, da so možnosti za povečanje mišične sile z električno stimulacijo večje kot pri običajni vadbi z utežmi. Njegove trditve so povzročile veliko zanimanje in sprožile nadaljnje raziskave, ki so potrdile omenjene učinke električne stimulacije (3). Namen pregleda literature pod mentorstvom doc. dr. Darje Rugelj je bil ugotoviti, ali električna stimulacija okrepi mišice pri osebah z okvaro zgornjega motoričnega nevrona. **Metode:** Pregled literature je vključeval pregled raziskav, ki so raziskovale vpliv električne stimulacije na izboljšanje funkcije pri osebah z okvaro zgornjega motoričnega nevrona (možganska kap, multipla skleroza, poškodbe hrbtenjače in cerebralna paraliza). Najdenih in pregledanih je bilo 124 raziskav, od tega je vključitvenim merilom ustrezalo 23 raziskav. Objavljene so bile od leta 1979 do 2011. Na temo električne stimulacije ter cerebralne paralize in multiple skleroze je bilo vključenih 8 raziskav. Pri raziskavah, narejenih na osebah po možganski kapi, jih je bilo vključenih 9, pri poškodbah hrbtenjače pa 6 raziskav. **Rezultati:** Rezultati študij pri cerebralni paralizi so pokazali izboljšanje moči v vseh preiskovalnih skupinah (kontrolna, z električno stimulacijo, placebo hotena vadba (krepitev mišic brez električne stimulacije)) znotraj študij, med skupinami ni prišlo do razlik. Pri multipli sklerozi so raziskave pokazale izboljšanje mišične moči samo v skupinah, ki so imele kombinacijo stimulacije s hoteno vadbo. Pri študijah, narejenih na osebah po možganski kapi, je prišlo do izboljšanja moči pri vseh preiskovanih skupinah, vendar je bilo izboljšanje moči največje pri skupini z električno stimulacijo. Rezultati v raziskavah na osebah po poškodbi hrbtenjače poročajo o nasprotujočih si rezultatih. **Zaključki:** Kljub dejstvu, da je pri vseh bolezenskih stanjih značilna okvara zgornjega motoričnega nevrona in da so študije med boleznimi uporabljale podobne metode in načela krepitve mišic, so samo študije, narejene na osebah po možganski kapi, imele boljše rezultate v prid električni stimulaciji. Potrebni je več raziskav glede krepitve mišic z električno stimulacijo pri osebah z okvaro zgornjega motoričnega nevrona.

Ključne besede: Električna stimulacija, krepitev, mišična moč, okvara zgornjega motoričnega nevrona.

Strengthening of muscle with electrical stimulation to improve function in persons with spinal cord injury

Introduction: When we strengthen the muscles, we influence the maximal force, which a muscle can develop. The ability of the muscle to create the maximum force refers to the muscular strength, which represents the intensity of the muscle (1). Strength training is based on overload principle, which means that the body has to be exposed to a bigger work stress than it is used to. The exercise has to be of sufficient intensity, duration and frequency. (2). There are several methods for muscle strengthening. One of them is electrical stimulation. As early as in 1973, Kots presented an article, in which he described the use of muscle electrical stimulation in muscle strengthening. He claimed that the possibilities for increasing muscle strength with electrical stimulation are greater than with regular exercise with weights. This caused a lot of interest and further research, which confirmed these effects of electrical stimulation (3). The purpose of the literature research under the mentorship of Darja Rugelj, PhD, was to find out if electrical stimulation strengthens the muscles after upper motor neuron injury. **Methods:** The literature research thesis is based on the expert and scientific literature research, which investigated whether muscle electrical stimulation improves function after motor neuron injury (brain stroke, multiple sclerosis, spinal cord injury, cerebral palsy). Based on the key words, I have found and researched 124 studies and 23 researches among them have met the criteria for integration. They were published from 1979 to 2011. The topics cerebral palsy and multiple sclerosis were included in eight researches. There were nine researches, which included the topic stroke, and six were adequate for spinal cord injuries. **Results:** The results of the cerebral palsy studies showed improvement in strength inside all researched groups (control, with electrical stimulation, placebo, strengthening exercise); there were no differences between the groups. The researches of multiple sclerosis have showed that the improvement of muscular strength has been done only in the groups, which had a combination of stimulation with weight training. The studies on the persons after brain stroke have showed improvement of strength with all groups. However, the improvement has been better with stimulation group. The studies on the persons with spinal cord injuries have showed opposite results. **Conclusion:** Despite the fact that all diseases are caused by upper motor neuron injury, and that studies used similar methods and principles of muscle strengthening, only the studies on the persons after brain stroke achieved better results in the electrical stimulation group. However, the fact is that more studies should be done.

Key words: Electric stimulation, strengthening, muscle strength, injury of upper motor neuron.

Literatura/References:

1. Knuttgen HG, Komi PV (1994). Basic definitions for exercise. In: Komi PV, eds. Strength and power in sport. The encyclopaedia of sports medicine. Australia: Blackwell Science, 3–6.
2. Åstrand PO, Rodahl K (1986). Textbook of work physiology. Physiological bases of exercise. 3th ed. United States of America: McGraw-Hill.
3. Kocjan D (2002). Primerjava različnih oblik električne stimulacije skeletnih mišic. Diplomsko delo. Ljubljana: Visoka šola za zdravstvo.